

the Ray Society in 1869. The older work has become naturally very incomplete, for during the last 50 years there has been an enormous increase in the knowledge of abnormal structures. The work will comprise two volumes, the first one containing the fungi, the bryophytes, and the root, stem, and leaf of the vascular plants. The algae are not included because they exhibit too few abnormalities to make description worth while. The second volume will deal with the flower. This bringing together of the great mass of material in convenient form will be a boon to those interested in teratology.—J. M. C.

Western wild flowers.—MARGARET ARMSTRONG,³ in collaboration with J. J. THORNBURGH, has written a handy and well illustrated volume under this title, which, although primarily intended for lovers of wild flowers, will be useful to botanists as well. The wild flowers of Washington, Oregon, California, Idaho, Utah, and Arizona are dealt with, but those found only in the Rocky Mountains are not included. The key to families is an excellent feature, and the usefulness of the volume would be much greater had it been extended to species. The collaboration of Professor THORNBURGH insures the accuracy of the text.—W. J. G. LAND.

NOTES FOR STUDENTS

Transpiration studies.—The desirability of giving a quantitative turn to ecological description and classification, together with the recognition that the most useful of such classifications have been based upon the water relations, has led to efforts to measure the power of the plant (1) to absorb water from its surroundings, (2) to distribute this water within its body, and (3) to prevent the loss of water to its environment. To study the third feature of the water relation some means of measuring the resistance offered by leaves and other parts of plants to water loss, or, stated in other words, of measuring the relative transpiring power of plants, has been needed. A further requirement of such a system is that it shall be readily applicable to plants growing in open soil. In seeking to meet this need LIVINGSTON⁴ has modified the cobalt paper method of STAHL, and adapted it to compare the transpiring power of a leaf with evaporation from a standard surface, namely, that of saturated blotting paper shown by RENNER to evaporate water at the same rate as an equal area of free water surface. In a series of experiments he has shown that this new method is probably the most satisfactory known for comparing the same plant at different times, or for comparing different plants, in regard to the transpiring power of their surfaces. The ratio of the time required for color change of the standardized cobalt chloride paper exposed over the standard surface, to the

³ ARMSTRONG, MARGARET, *Field book of western wild flowers*. 16mo. pp. xx+396. *figs.* 548. New York: Putnam. 1915.

⁴ LIVINGSTON, B. E., The resistance offered by leaves to transpirational water loss. *Plant World* 16:1-35. 1913.